From: Richard Parrish [mailto:clupeid@sbcglobal.net]
Sent: Wednesday, February 27, 2008 4:29 PM
To: Steve Morgan SAT Chair
Cc: Melissa Miller-Henson; Ken Wiseman; John Ugoretz
Subject: Review of Evaluation Methods

Dear Dr. Morgan

I attended the recent Pacifica MLPA meeting and was glad to see that modeling is now being used to evaluate the various MPA proposals. It was clear from Dr. Costello's presentation that the several MLPA proposals have only small differences in their response to the analyses. However, it was also clear that the fishery outside of the MPA networks had a huge affect on the modeled response of the proposals.

The expected future fishing mortalities of the fishes and invertebrates in the North-Central area is a subject that has received very little documentation or analysis. According to Dr. Costello's presentation the primary feature that will determine the response of the MPA network proposals is the level of exploitation outside of the MPAs. I feel that the MLPA staff, or Department of Fish and Game should provide their best estimate of the expected fishing mortalities of the major exploited species in the North-Central area so that the best available model simulations can be made. Based on the landings it appears that very few species have significant exploitation, a couple of species have been overfished in the past and a couple of species are presently close to MSY. The models should include examples of each of these three situations.

I suggest that this is an item that should be included in the agenda of the next SAT meeting. I have attached my review of "Methods Used to Evaluate Draft MPA Proposals in the North Central Coast Study Region (DRAFT)". This review explains the above in more detail and it also discusses several other ways that evaluations of the North Central Coast Study Region can be improved.

I would appreciate it if my review could be forwarded to the SAT and hopefully to the CDF&G Nearshore Groundfish Program Leader who would be the person probably responsible for the assessment of the expected future exploitation rates in the North Central Study Region.

Richard Parrish
Fisheries Biologist

Review of

Methods Used to Evaluate Draft MPA Proposals in the North Central Coast Study Region (DRAFT)

January 23, 2008

By

Richard H. Parrish PhD Fisheries

There are a number of ways that the Evaluations of Proposals can be improved; the principal improvements include a more balanced view of the guidelines, a realistic assessment of the effects that the future fishery outside of the MPAs will have on the performance of the MPA proposals and development of numerical values for the levels of protection. I have also included several secondary comments.

Balanced View of the Guidelines Section 5.0 Size and spacing

The size and spacing guidelines developed in the MLPA process are inexact estimates; for example the 3 nautical mile offshore guideline is purely political; not ecological. The problem with the guidelines is not that the guidelines are approximations, the problem is that the guidelines are applied as if they are exact. Some guidelines have become rules and other guidelines have been entirely ignored.

Size

When the alongshore (3 mi.) and offshore (3 mi.) dimensions favored by the North-Central SAT are multiplied, the SAT's result is 9 sq. mi. Of course this number is not correct. The offshore distance to the State Line is 3 nautical miles (5.56 km), the alongshore minimum developed by the South-Central SAT was 5 km; therefore the real result of the North-Central SAT reasoning is 5.56*5 = 27.8 sq km. or 10.7 sq. mi. - NOT 9 SQ. MI. It is disappointing that the SAT can be this far off in their calculations yet they insist that there is an exact ecological meaning to a 9 sq. mi. area. Unfortunately 9 sq. mi. is used to set an absolute size under which no MPAs will be evaluated for ecological goals (Goals 2 and 6). The startling assumption that a 9.0 sq mi. MPA will have full ecological effect whereas an 8.5 sq. mi. MPA will have no ecological effect can only be described as poor science.

The 9 sq. mi. rule now dominates the whole MLPA process. Stakeholders are now designing MPA networks that are heavily constrained by the 9 sq. mi. rule. The refusal to evaluate a MPA cluster of less than 9 sq. mi. cannot be scientifically defended and it seriously affects the use of MPAs in achieving all Goals.

Spacing

Spacing guidelines are round numbers (i.e. 50-100 km) that were chosen to approximately balance the broad range of larval dispersal distances exhibited by the relative small number of species for which dispersal distances have been estimated. The South-Central Process resulted in the rejection of any Proposal that had spacing between MPAs greater than the maximum guideline. Therefore the 100 km spacing changed from a guideline to a rule.

The transformation of some guidelines into rules while at the same time completely ignoring the rest of the guidelines has resulted in a very narrow range of proposals all of which contradict the guidelines. All of the North-Central proposals are bound by MPAs that have the maximum offshore dimension, the minimum alongshore dimension and spacing less than the half of the minimum guideline (50 km) with some spacings less than 1/10 of the 50 km minimum guideline. There are heavy penalties applied for MPAs that fall below the minimum guideline for size and no penalties for MPAs with spacing below the minimum guideline or above the maximum size guideline. Balance is clearly lacking.

Essentially the guidelines are being selective applied in a way that results in greatly favoring larger MPA Proposals; in fact there is no limit to the bias towards larger area with the result that a single reserve occupying the entire North-Central area would score highest on the present evaluation. Its only failing would be replicates. In fact with the present evaluation methods the perfect MPA network would consist of 3 reserves, one occupying all of the South-Central area, one occupying all of the North-Central area and one occupying all of the North area. Is this really the intention of AB 993?

Realistic assessment of the effects that the future fishery outside of the MPAs will have on the performance of the MPA network

The evaluation methods are limited to the affects of MPAs on fisheries and no mention or analysis of the effects of fisheries on the MPAs is attempted. Modeling studies clearly show that the intensity of fishing outside of MPAs has a major affect on the populations inside of the MPAs and that the effect is highly dependent upon the dispersal distances of larval and juvenile stages and mobility of adults. Regions that are fished very conservatively will require less area in MPAs to achieve ecosystem goals than regions that are fully exploited. MPAs in regions that are heavily overfished and have little protective regulations and/or poor enforcement will provide some population and diversity protection; however, they will be unlikely to produce the ecosystem goals of the MLPA process. MPAs are not an alternative to conservative fishery management.

The most direct way to determine the effectiveness of MPA networks is the modeling being carried out as part of the North-Central MLPA Process. To accomplish this modelers need a best available estimate of the current fishing mortality rates on a range of species and the expected rates that will occur in the future. The best estimate of the expected effects of fishing on the performance of the MPA network will be from models

using the expected future fishing mortalities.

It is clear from the 2006 commercial landings in the North-Central Region that the vast majority of fishes and invertebrates living in State Waters have very low commercial exploitation rates: Dungeness crab, sea urchin, some nearshore and shallow shelf rockfishes and possibly California halibut and white seabass being the exceptions. Recreational exploitation rates of some hard-bottom reef species may also be substantial. To demonstrate the effects of MPAs the models should include a mixture of the important exploited species and some of those that have very low exploitation due to present fishing regulations and lack of access (i.e. shelf flatfishes and surfperches). Note that fishing effort cannot be transferred to species that cannot be caught due to present gear regulations (i.e. shortbelly rockfish and shelf flatfishes)

The Department of Fish and Game should provide the SAT modelers with estimates of the expected exploitation rates and they should pay particular attention to any species that is considered to have exploitation rates close to or exceeding sustainable rates. They should also provide an estimate of the highest exploitation rates that the California Fish and Game Commission is likely to allow

The evaluation models should then be run with these two sets of estimates to provide the expected range of harvest likely to impact the MPA networks proposed.

Levels of Protection

The protection levels developed by the North-Central SAT are an improvement over those used in the South-Central region. However, they still could be greatly improved and refined. The principal problem with the present levels is that they are limited to presence-absence and do not consider the volume of the fishing activity being described. Also the lack of numerical description of the mortality rates expected with the several classifications makes it impossible to model or analyze the differences between the several protection levels. A secondary problem is that there is no way to accumulate or adjust the protection or lack of protection within the several classifications; for example, allowing a harvest of urchins and no harvest of rockfish, or visa versa. A minor problem, one that will be more important in the North region, is that no protection level is assigned for recreational or commercial hand harvest of edible kelps.

Other Comments

1. Page v and Page 19. Table 3. The amount of habitat in an MPA necessary to encompass 90% of local biodiversity.

Measurement of diversity is heavily dependent upon the area covered by the individual sampling units. Larger sample areas tend to include a larger number of species than smaller sample areas; this is primarily due to two factors (1) species at low population densities are sampled at a higher rate as sample area increases simply due to sampling

effort (2) larger sample areas tend to include a wider range of mico-habitats therefore increasing the number of mico-habitats, and number of species.

The area sampled on sandy habitat (30-100 M) by individual samples in the NMFS triennial trawl surveys is huge (probably 3-4 orders of magnitude) in comparison to the area included in samples in the other habitats (and sampling methods) in table 3. The large differences in areas listed in Table 3 are primarily due to the very large differences in area sampled rather than an indication of the amount of area necessary to include 90% diversity. This table is a good example of comparing apples and oranges; also the table should use metric units as used in the explanatory figures.

2. Page 19 Last paragraph. It is rightly pointed out that soft-bottom fishes that use the 30-100 m depth habitat extend their distribution into the 0-30 m soft-bottom habitat and therefore the area of both habitats was used to assess the percent of biodiversity encompassed by a given MPA. An examination of the depth distributions of the fishes using the 30-100m hard bottom habit shows that they also use the 0-30m hard-bottom habitat; therefore the two depth zones should be combined for hard bottom as well. It should be noted that while the great majority of the species that use the deeper habitat also use the shallower habitat there are many species in the shallower habitat that do not use the deeper habitat. So while the two areas should be combined to assess the deeper habitats they should not be combined to assess the shallower habitats.

3. Section 6.0 The North-Central SAT has decided that only 0.12 sq mi of estuary constitutes an ecologically effective area for evaluation of goals 2 and 6. It is difficult to determine why marine birds and mammals require 9 sq mi of open ocean habitat while estuarine birds and mammals only require 0.12 sq mi of estuarine habitat. This needs to be further explained; and it should be noted that the 0.12 sq mi area will become a very bad precedent when it comes time to put estuarine MPAs in San Francisco Bay and Humboldt Bay.

Section 6 only addresses birds and mammals; where is the corresponding analyses of fishes and invertebrates?

4. Page 25 Table 4. Table four is a good example of the inability of the MLPA process to respond to outside scientific input. This table was originally presented in the South-Central MPLA process; I repeatedly pointed out to individual SAT members that there is extensive evidence, including tagging studies, that adult sardines move >1000 km from spawning grounds in central and southern California to feeding grounds in the Oregon to Vancouver Island area. In addition, tagging studies carried out by CDF&G in the 1970s clearly showed that anchovies move >100 km as fish tagged in southern California and San Francisco Bay were recovered in Monterey Bay. Herring should also be moved from the 10-100 km category to the 100-1000 km category based on catch distribution and known spawning grounds. Whiting should be moved to the >1000 km category based on annual movement between feeding grounds and spawning grounds (i.e. very similar to sardine).